Amendments to the Claims

1. **(Currently Amended)** An OFDM demodulation apparatus for demodulating an OFDM signal which includes a specific synchronous symbol and an OFDM data symbol structured by a valid symbol period and a guard interval, said apparatus comprising:

an impulse response estimation part for estimating an impulse response from ~~said~~ the OFDM signal based on the synchronous symbol;

an integration part for integrating an output obtained by estimation in said impulse response estimation part;

a determination part for detecting symbol timing indicating a period where ~~said~~ an output obtained by integration in said integration part is maximum;

a window timing generation part for generating, according to ~~said~~ the symbol timing, window timing including information which is capable of providing ~~said~~ the valid symbol period; and

a Fourier transformation part for subjecting ~~said~~ the OFDM signal to Fourier transform according to ~~said~~ the window timing.

2. **(Withdrawn - Currently Amended)** The OFDM demodulation apparatus according to claim 1, when an identical waveform is periodically transmitted in ~~said~~ the synchronous symbol ~~for~~ at least twice ~~or more~~, said apparatus further comprising:

a delay part for delaying ~~said~~ the OFDM signal for a predetermined number of samplings;

a multiplication part for multiplying a signal obtained by delay in said delay part and ~~said~~ the OFDM signal;

an averaging part for averaging a signal obtained by multiplication in said multiplication part;

a frequency error calculation part for calculating a frequency error based on a signal obtained by averaging in said averaging part;

a hold part for holding ~~said~~ the frequency error according to ~~said~~ the symbol timing; and

a frequency correction part for correcting a frequency shift of ~~said~~ the OFDM signal according to ~~said~~ the frequency error provided by said hold part, wherein said Fourier transformation part subjects, to Fourier transform, ~~said~~ the OFDM signal with frequency shift corrected by said frequency correction part according to ~~said~~ the window timing.

3. **(Withdrawn - Currently Amended)** The OFDM demodulation apparatus according to claim 1, when an identical waveform is periodically transmitted in ~~said~~ the synchronous symbol ~~for~~ at least twice ~~or more~~, ~~the~~ said apparatus further comprising:

a first delay part for delaying ~~said~~ the OFDM signal, as a ~~(hereinafter,~~ first OFDM signal~~)~~, for a first predetermined number of samplings;

a first multiplication part for multiplying a signal obtained by delay in said first delay part and ~~said~~ the first OFDM signal;

B1 cont

a first averaging part for averaging a signal obtained by multiplication in said first multiplication part;

a first frequency error calculation part for calculating a first frequency error based on a signal obtained by averaging in said first averaging part;

a filter part for smoothing a signal obtained by multiplication in said first multiplication part;

an absolute value calculation part for calculating an absolute value of a signal obtained by smoothing in said filter part;

a first determination part for determining, according to ~~said~~ the absolute value, a correlation between ~~said~~ the first OFDM signal and the signal obtained by delay in said first delay part, and detecting symbol timing of ~~said~~ the first OFDM signal;

a first hold part for holding ~~said~~ the first frequency error according to ~~said~~ the symbol timing detected by said first determination part;

a first frequency correction part for correcting a frequency shift of ~~said~~ the first OFDM signal according to ~~said~~ the first frequency error provided by said first hold part;

a second delay part for delaying, for a second predetermined number of samplings, ~~said~~ the first OFDM signal, as a second OFDM signal, with frequency shift corrected by ~~the~~ said first frequency correction part ~~(hereinafter, second OFDM signal)~~;

B

a second multiplication part for multiplying a signal obtained by delay in said second delay part and ~~said~~ the second OFDM signal;

a second averaging part for averaging a signal obtained by multiplication in said second multiplication part;

a second frequency error calculation part for calculating a second frequency error based on a signal obtained by averaging in said second averaging part;

a second hold part for holding ~~said~~ the second frequency error according to ~~said~~ the symbol timing detected by said determination part; and

a second frequency correction part for correcting a frequency error of ~~said~~ the second OFDM signal according to ~~said~~ the second frequency error provided by said second hold part, wherein

said impulse response estimation part estimates the impulse response from ~~said~~ the second OFDM signal, and

said Fourier transformation part subjects, to Fourier transform, ~~said~~ the second OFDM signal with frequency shift corrected by said second frequency conversion part according to ~~said~~ the window timing.

B1 Cont 5

~~4.~~ **(Currently Amended)** The OFDM demodulation apparatus according to claim 1, wherein said integration part regards a time length of ~~said~~ the guard interval as an integration section, and integrates an incoming signal while sequentially shifting ~~the~~ a location of the integration section with respect to the incoming signal.

6

~~5.~~ **(Currently Amended)** The OFDM demodulation apparatus according to claim 1, wherein said integration part regards a time length of ~~said~~ the guard interval and a predetermined time length before and after the guard interval as an integration section, and by integrating an incoming signal while sequentially shifting ~~the~~ a location of the integration section with respect to the incoming signal, responds before and after a rectangular impulse response in the time length of ~~said~~ the guard interval.

7

6. **(Currently Amended)** The OFDM demodulation apparatus according to claim 1, wherein said integration part regards a time length of ~~said~~ the guard interval and a predetermined time length before and after the guard interval as an integration section, and by integrating an incoming signal while sequentially shifting ~~the~~ a location of the integration section with respect to the incoming signal, responds ~~monotonously increasing~~ with a monotonous increase before a rectangular impulse response in the time length of ~~said~~ the guard interval ~~but monotonously decreasing thereafter~~ and a monotonous decrease after the rectangular impulse response.

8

7. **(Currently Amended)** The OFDM demodulation apparatus according to claim 1, wherein said impulse response estimation part comprises:

a synchronous symbol generation part for generating a signal identical to ~~said~~ the synchronous symbol;

B1 Cont

a correlation part for calculating a signal indicating how the signal generated by said synchronous symbol generation part and ~~said~~ the OFDM signal are correlated to each other; and

a correlation calculation part for calculating a correlation from the signal obtained by calculation in said correlation part.

12

8. **(Currently Amended)** The OFDM demodulation apparatus according to claim 1, wherein said impulse response estimation part comprises:

a synchronous symbol generation part for generating a signal whose frequency domain is identical to ~~said~~ the synchronous symbol;

a multiplication part for multiplying a signal provided by said Fourier transformation part and the signal provided by said synchronous symbol generation part;

an inverse Fourier transformation part for subjecting, to inverse Fourier transform, a signal obtained by multiplication in said multiplication part; and

a correlation calculation part for calculating a correlation from a signal provided by said inverse Fourier transformation part.

9. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~7~~ 8, wherein

said correlation calculation part calculates an absolute value of a complex vector (i, q) of the incoming signal.

10. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~8~~ 12, wherein

said correlation calculation part calculates an absolute value of a complex vector (i, q) of the incoming signal.

11. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~7~~ 8, wherein

said correlation calculation part calculates a sum of an absolute value of i and an absolute value of q from ~~the~~ a complex vector (i, q) of the incoming signal.

12. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~8~~ 12, wherein

said correlation calculation part calculates a sum of an absolute value of i and an absolute value of q from ~~the~~ a complex vector (i, q) of the incoming signal.

13. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~7~~ 8, wherein

said correlation calculation part calculates a sum of a square of i and a square of q from ~~the~~ a complex vector (i, q) of the incoming signal.

14. **(Currently Amended)** The OFDM demodulation apparatus according to claim ~~8~~ 12, wherein

said correlation calculation part calculates a sum of a square of i and a square of q from ~~the~~ a complex vector (i, q) of the incoming signal.

14

~~15.~~ **(Withdrawn - Currently Amended)** The OFDM demodulation apparatus according to claim 3, wherein

said first determination part receives ~~said~~ the absolute value calculated by said absolute value calculation part, detects a value for invariability thereof, and then detects the absolute value showing a predetermined proportion to the invariable value.

Claims 16-21 (Canceled)

16

~~22.~~ **(Currently Amended)** An OFDM demodulation method for demodulating an OFDM signal which includes a specific synchronous symbol and an OFDM data symbol structured by a valid symbol period and a guard interval, said method comprising:

an impulse response estimation ~~step~~ operation of estimating an impulse response from ~~said~~ the OFDM signal based on the synchronous symbol;

an integration ~~step~~ operation of integrating an output obtained by estimation in said impulse response estimation ~~step~~ operation;

B1 Cont

a determining ~~step~~ operation of detecting symbol timing indicating a period where ~~said~~ an output obtained by integration in said integration ~~step~~ operation is maximum;

a window timing generation ~~step~~ operation of generating, according to ~~said~~ the symbol timing, window timing including information which is capable of providing ~~said~~ the valid symbol period; and

a Fourier transformation ~~step~~ operation of subjecting ~~said~~ the OFDM signal to Fourier transform according to ~~said~~ the window timing.

17

~~23.~~ **(Withdrawn - Currently Amended)** The OFDM demodulation method according to claim 16 ~~22~~, when an identical waveform is periodically transmitted in ~~said~~ the synchronous symbol ~~for~~ at least twice ~~or more~~, ~~the~~ said method further comprising ~~the steps of~~:

delaying ~~said~~ the OFDM signal for a predetermined number of samplings;

multiplying a signal obtained by delay in said ~~delay part~~ delaying operation and ~~said~~ the OFDM signal;

averaging a signal obtained by multiplication in said ~~multiplication part~~ multiplying operation;

calculating a frequency error based on a signal obtained by averaging in said averaging ~~part~~ operation;

holding ~~said~~ the frequency error according to ~~said~~ the symbol timing; and

correcting a frequency shift of ~~said~~ the OFDM signal according to ~~said~~ the frequency error provided in said holding ~~step~~ operation, wherein in said Fourier-transform ~~step~~ operation, ~~said~~ the OFDM signal with frequency shift corrected is subjected to Fourier transform according to ~~said~~ the window timing.

18
24. **(Withdrawn - Currently Amended)** The OFDM demodulation method according to claim 16 ~~22~~, when an identical waveform is periodically transmitted in ~~said~~ the synchronous symbol ~~for~~ at least twice ~~or more~~, ~~the~~ said method further comprising:

B1 cont

a first delay ~~step~~ operation of delaying ~~said~~ the OFDM signal, as a ~~(hereinafter,~~ first OFDM signal~~)~~, for a first predetermined number of samplings;

a first multiplication ~~step~~ operation of multiplying a signal obtained by delay in said first delay ~~step~~ operation and ~~said~~ the first OFDM signal;

a first averaging ~~step~~ operation of averaging a signal obtained by multiplication in said first multiplication ~~step~~ operation;

a ~~step~~ first frequency error calculating operation of calculating a first frequency error based on a signal obtained by averaging in said first averaging ~~step~~ operation;

~~a step of~~ smoothing a signal obtained by multiplication in said first multiplication ~~step~~ operation;

~~a step of~~ calculating an absolute value of a signal obtained by smoothing in smoothing ~~step~~ operation;

a first determination ~~step~~ operation of determining, according to ~~said~~ the absolute value, a correlation between ~~said~~ the first OFDM signal and the signal obtained by delay in said first delay ~~step~~ operation, and detecting symbol timing of ~~said~~ the first OFDM signal;

a ~~step~~ first holding operation of holding ~~said~~ the first frequency error according to ~~said~~ the symbol timing detected in said first determination ~~step~~ operation;

B

a ~~step~~ first frequency correction operation of correcting a frequency shift of ~~said~~ the first OFDM signal according to ~~said~~ the first frequency error held;

a second delay ~~step~~ operation of delaying, for a second predetermined number of samplings, ~~said~~ the first OFDM signal, as a second OFDM signal, with frequency shift corrected ~~(hereinafter, second OFDM signal)~~;

a second multiplication ~~step~~ operation of multiplying a signal obtained by delay in said second delay ~~step~~ operation and ~~said~~ the second OFDM signal;

a second averaging ~~step~~ operation of averaging a signal obtained by multiplication in said second multiplication ~~step~~ operation;

a ~~step~~ second frequency error calculating operation of calculating a second frequency error based on a signal obtained by averaging in said second averaging ~~step~~ operation;

a ~~step~~ second holding operation of holding ~~said~~ the second frequency error according to ~~said~~ the symbol timing detected in said determination ~~step~~ operation; and

a ~~step~~ second frequency correction operation of correcting a frequency shift of ~~said~~ the second OFDM signal according to ~~said~~ the second frequency error held,

B1 cont

wherein in said estimating ~~step~~ operation, an impulse response is estimated from ~~said~~ the second OFDM signal, and

in said Fourier-transform ~~step~~ operation, according to ~~said~~ the window timing, ~~said~~ the second OFDM signal with frequency shift corrected is subjected to Fourier transform.

20 ~~25~~. **(Currently Amended)** The OFDM demodulation method according to claim 16 ~~22~~, wherein in said integrating ~~step~~ operation, a time length of ~~said~~ the guard interval is ~~regard~~ regarded as an integration section, and an incoming signal is integrated while ~~the~~ a location of the integration section ~~being~~ is sequentially shifted with respect to the incoming signal.

21 ~~26~~. **(Currently Amended)** The OFDM demodulation method according to claim 16 ~~22~~, wherein in said integrating ~~step~~ operation, a time length of ~~said~~ the guard interval and a predetermined time length before and after the guard interval are regarded as an

B

integration section, and by integrating an incoming signal while sequentially shifting ~~the~~ a location of the integration section with respect to the incoming signal, a response is provided before and after a rectangular impulse response having the time length of ~~said~~ the guard interval.

22 16
~~27~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~22~~, wherein in said integrating ~~step~~ operation, a time length of ~~said~~ the guard interval and a predetermined time length before and after the guard interval are regarded as an integration section, and by integrating an incoming signal while sequentially shifting ~~the~~ a location of the integration section with respect to the incoming signal, a response which monotonously ~~increasing~~ increases before a rectangular impulse response having the time length of ~~said~~ the guard interval ~~but~~ and monotonously ~~decreasing thereafter~~ decreases after the rectangular response is provided.

23 16
~~28~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~22~~, wherein said ~~estimating step~~ impulse response estimation operation comprises ~~the steps of~~:

generating a signal identical to ~~said~~ the synchronous symbol;

calculating a signal indicating a correlation between a signal generated in said generating ~~step~~ operation and ~~said~~ the OFDM signal; and

calculating a correlation from ~~a~~ the signal obtained in said calculating ~~step~~ operation.

27 16
~~29~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~22~~, wherein said ~~estimating step~~ impulse response estimation operation comprises ~~the steps of~~:

generating a frequency-domain signal identical to ~~said~~ the synchronous symbol;

multiplying a signal obtained in said Fourier-transform ~~step~~ operation and the frequency-domain signal generated in said generating ~~step~~ operation;

inverse-Fourier-transforming a signal obtained in said multiplying ~~step~~ operation into an inverse-Fourier-transformed signal; and

calculating a correlation from a signal obtained in said ~~inverse-Fourier-transformed signal~~ inverse-Fourier-transforming operation.

24 23
~~30~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~28~~, wherein

in said calculating ~~step~~ operation, calculating an absolute value of a complex vector (i, q) of the incoming signal ~~is calculated~~.

28 27
~~31~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~29~~, wherein

in said calculating ~~step~~ operation, calculating an absolute value of a complex vector (i, q) of the incoming signal ~~is calculated~~.

25 23
~~32~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~28~~, wherein

in said calculating ~~step~~ operation, calculating a sum of an absolute value of i and an absolute value of q ~~is calculated~~ from ~~the~~ a complex vector (i, q) of the incoming signal.

29 27
~~33~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~29~~, wherein

in said calculating ~~step~~ operation, calculating a sum of an absolute value of i and an absolute value of q ~~is calculated~~ from ~~the~~ a complex vector (i, q) of the incoming signal.

26 23
~~34~~. **(Currently Amended)** The OFDM demodulation method according to claim ~~28~~, wherein

in said calculating ~~step~~ operation, calculating a sum of a square of i and a square of q ~~is calculated~~ from ~~the~~ a complex vector (i, q) of the incoming signal.

30
~~35~~. **(Currently Amended)** The method for OFDM demodulation according to claim ~~29~~ 27, wherein

in said calculating ~~step~~ operation, calculating a sum of a square of i and a square of q ~~is calculated~~ from ~~the~~ a complex vector (i, q) of the incoming signal.

19
~~36~~. **(Withdrawn - Currently Amended)** The OFDM demodulation method according to claim ~~24~~ 18, wherein

in said first determination ~~step~~ operation, a value for invariability of ~~said~~ the absolute value is detected, and then the absolute value showing a predetermined proportion to the invariable value is detected.

Claims 37-42 (Canceled)

31
~~43~~. **(Currently Amended)** An OFDM demodulation apparatus for demodulating an OFDM signal which includes a specific synchronous symbol and an OFDM data symbol structured by a valid symbol period and a guard interval, ~~and said~~ the OFDM data symbol ~~is~~ being generated from a plurality of subcarriers, said apparatus comprising:

an impulse response estimator operable to estimate an impulse response from ~~said~~ the OFDM signal based on the synchronous symbol;

an integrator operable to integrate an output obtained by estimation in said impulse response estimator;

a determiner operable to detect symbol timing indicating a period where ~~said~~ an output obtained by integration in said integrator is maximum;

a window timing generator operable to generate, according to ~~said~~ the symbol timing, window timing including information which is capable of providing ~~said~~ the valid symbol period; and

a separator operable to separate ~~said~~ the OFDM signal into the plurality of subcarriers according to ~~said~~ the window timing.

32
~~44~~. **(Currently Amended)** An OFDM demodulation method for demodulating an OFDM signal which includes a specific synchronous symbol and an OFDM data symbol

structured by a valid symbol period and a guard interval, ~~and said~~ the OFDM data symbol ~~is~~ being generated from a plurality of subcarriers, said method comprising:

an impulse response estimation ~~step~~ operation of estimating an impulse response from ~~said~~ the OFDM signal based on the synchronous symbol;

an integration ~~step~~ operation of integrating an output obtained by estimation in said impulse response estimation ~~step~~ operation;

B1 Cont'd

a determination ~~step~~ operation of detecting symbol timing indicating a period where ~~said~~ an output obtained by integration in said integration ~~step~~ operation is maximum;

a window timing generation ~~step~~ operation of generating, according to ~~said~~ the symbol timing, window timing including information which is capable of providing ~~said~~ the valid symbol period; and

a separation ~~step~~ operation of separating ~~said~~ the OFDM signal into ~~a~~ the plurality of subcarriers according to ~~said~~ the window timing.